In re Patent Application of:
BREWER
Serial No. **09/674,444**
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IN THE CLAIMS

1. (currently amended) A method of measuring jitter in a digital signal comprising:

forming a jitter-free offset reference clock signal from said digital signal being offset by a predetermined frequency amount from said digital signal, wherein the jitter-free offset reference clock signal moves relative to a transition point for bits of the digital signal;

sampling said digital signal with only a ~~said~~ reference clock signal at sampling times determined by an integer multiple of the frequency of said jitter-free offset reference clock signal, such that, in the absence of jitter and said offset by a predetermined frequency, there are a predetermined number of sampling times in each bit of said digital signal;

detecting occasions when the number of sampling times in any bit of said digital signal is different from said predetermined number;

counting said occasions over a predetermined time, and

deriving at least one measure of jitter from said counting of said occasions;

wherein one of said at least one measure of jitter is obtained by counting up one value for each of said occasions representing sampling times greater than the predetermined number within a bit, counting down one value for each of said occasions representing sampling times less than the predetermined number within a bit and determining the difference between the maximum count value and the minimum count value.

2. (currently amended) A method according to claim 1, wherein said jitter-free offset reference clock signal is formed by extracting a clock signal from said digital signal and offsetting said clock signal by said predetermined frequency.

3. (currently amended) A method according to claim 2, further including smoothing said jitter-free offset reference clock signal.

4. (cancelled)

5. (currently amended) A method according to claim 1, wherein said sampling ~~the~~ times are at clock bit intervals being plus and minus one of said integer multiple.

6. (previously presented) A method according to claim 1, wherein the predetermined time is inversely proportional to the product of the bit rate of the digital signal and the predetermined frequency amount.

7. (Cancelled)

8. (currently amended) A method of measuring jitter in a digital signal comprising:

forming a jitter-free offset reference clock signal from said digital signal being offset by a predetermined frequency amount from said digital signal, wherein the jitter-free offset reference clock signal moves relative to a transition point for bits of the digital signal;

sampling said digital signal with only a reference clock signal at sampling times determined by an integer multiple of the frequency of said jitter-free offset reference clock signal, such that, in the absence of jitter and said

offset by a predetermined frequency, there are a predetermined number of sampling times in each bit of said digital signal;

detecting occasions when the number of sampling times in any bit of said digital signal is different from said predetermined number;

counting said occasions over a predetermined time, and

deriving at least one measure of jitter from said counting of said occasions;

~~A method according to claim 1,~~ wherein one of said at least one measure of jitter is obtained by counting up one value for each of said occasions representing sampling times greater than the predetermined number within a bit, counting down one value for each of said occasions representing sampling times less than the predetermined number within a bit and determining the time difference between the first occasion of the maximum count value and the last occasion of the minimum count value.

9. (previously presented) A method according to claim 8, wherein the time difference is divided by said integer multiple and said predetermined time.

10. (currently amended) An apparatus for measuring jitter in a digital signal comprising:

means for forming a jitter-free offset reference clock signal from said digital signal, which clock signal is offset by a predetermined frequency amount from said digital signal, wherein the jitter-free offset reference clock signal moves relative to a transition point for bits of the digital signal;

means for sampling said digital signal only with a ~~said~~ reference clock signal at sampling times determined by said jitter-free offset reference clock signal, such that, in the absence of jitter and said offset by a predetermined frequency, there are a predetermined number of sampling times ~~items~~ in each bit of said digital signal;

means for detecting occasions when the number of sampling times in any bit of said digital signal is different from said predetermined number; and

means for counting said occasions over a predetermined time, and

means for deriving at least one measure of jitter from said means for counting of said occasions, said deriving means comprising means for counting up one value for each of said occasions representing sampling times greater than the predetermined number within a bit and for counting down one value for each of said occasions representing sampling times less than the predetermined number within a bit and means for determining the time difference between the first occasions of the maximum count value and the last occasion of the minimum count value.

11. (previously presented) An apparatus according to claim 10, wherein said means for forming said offset reference clock signal comprises means for extracting a clock signal from said digital signal and means for offsetting the clock signal by said predetermined frequency.

12. (previously presented) An apparatus according to claim 11, wherein said means for forming said offset reference clock signal includes means for smoothing said offset reference clock signal.

13. (cancelled).

14. (cancelled).

15. (currently amended) An apparatus for measuring jitter in a digital signal comprising:

an offset unit arranged to form a jitter-free offset reference clock signal from said digital signal, being offset by a predetermined frequency amount from said digital signal, wherein the jitter-free offset reference clock signal moves relative to a transition point for bits of the digital signal;

a sampler arranged to sample said digital signal with only a ~~said~~ reference clock signal at sampling times determined by said jitter-free offset reference clock signal such that, in the absence of jitter and said offset by a predetermined frequency, there are a predetermined number of sampling times in each bit of said digital signal;

at least one detector arranged to detect occasions when the number of sampling items in any bit of said digital signal is different from said predetermined number;

a counter arranged to count said occasions over a predetermined time, wherein the predetermined time is inversely proportional to the product of the bit rate of the digital signal and the predetermined frequency amount, and

an analyzer arranged to derive at least one measure of jitter from said counting of said occasions;

wherein one of said at least one measure of jitter is obtained by counting up one value for each of said occasions representing sampling times greater than the predetermined number within a bit, counting down one value for each of said occasions representing sampling times less than the predetermined number within a bit and determining the

difference between the maximum count value and the minimum count value.

16. (previously presented) The apparatus according to claim 10, wherein said sampling times are determined by an integer multiple of the frequency of said offset reference clock signal.

17. (previously presented) The apparatus of claim 15, wherein the offset reference clock signal is formed by extracting a clock signal from said digital signal and offsetting said clock signal by said predetermined frequency.

18. (previously presented) The apparatus of claim 17, further including smoothing said offset reference clock signal.

19. (previously presented) The apparatus of claim 15, wherein said sampling times are determined by an integer multiple of the frequency of said offset reference clock signal.

20. (previously presented) The apparatus of claim 19, wherein said sampling the times are at clock bit intervals being plus and minus one of said integer multiple.

21. (cancelled)

22. (currently amended) An apparatus for measuring jitter in a digital signal comprising:

an offset unit arranged to form a jitter-free ~~an~~ offset reference clock signal from said digital signal, being offset by a predetermined frequency amount from said digital signal, wherein the jitter-free offset reference clock signal moves relative to a transition point for bits of the digital signal;

a sampler arranged to sample said digital signal with only a reference clock signal at sampling times determined by said jitter-free offset reference clock signal such that, in the absence of jitter and said offset by a predetermined frequency, there are a predetermined number of sampling times in each bit of said digital signal;

at least one detector arranged to detect occasions when the number of sampling items in any bit of said digital signal is different from said predetermined number;

a counter arranged to count said occasions over a predetermined time, wherein the predetermined time is inversely proportional to the product of the bit rate of the digital signal and the predetermined frequency amount, and

an analyzer arranged to derive at least one measure of jitter from said counting of said occasions;

~~The apparatus according to claim 19,~~ wherein one of said at least one measure of jitter is obtained by counting up one value for each of said occasions representing sampling times greater than the predetermined number within a bit, counting down one value for each of said occasions representing sampling times less than the predetermined number within a bit and determining the time difference between the first occasion of the maximum count value and the last occasion of the minimum count value.

23. (previously presented) The apparatus according to claim 22, wherein the time difference is divided by said integer multiple and said predetermined time.